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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
SNELTING, ERIN LYNN	
ART UNIT	PAPER NUMBER
1791	

NOTIFICATION DATE	DELIVERY MODE
11/13/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

INFO@ORTPATENT.COM

Office Action Summary	Application No.	Applicant(s)	
	10/560,023	KIM ET AL.	
	Examiner	Art Unit	
	Erin Snelting	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 June 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,6,7 and 9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6,7 and 9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Acknowledgement is made of amendment received 06-26-2009. Claims 1, 6, and 9 are amended, and claims 3, 5, and 8 are cancelled.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 6, 7, and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 6 is unclear because the first heat-treatment temperature is recited as a range of 400 to 900°C (lines 3-4), but the first heat-treatment is subsequently recited as reaching 700°C (lines 6-7). It is unclear if the first heat-treatment is required to reach at least 700°C.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1, 2, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang '129 (US Patent No. 5,650,129) in view of Duraiswami '873 (US Patent No. 6,616,873 B1).

8. Regarding claims 1 and 4, Kang ‘129 teaches:

a. heat-treating a silica gel by increasing its temperature to 1050 to 1200°C (“Silica gel particles…heated…up to 1100°C", column 3, lines 1-7)

b. maintaining the temperature for a predetermined time (“The temperature of 1100°C was maintained for one hour”, column 3, lines 7-8).

Kang ‘129 is silent regarding a temperature elevating speed of 5 to 90°C per minute, or of 10°C to 70°C per minute, and regarding the heat-treatment being performed in a rotary tube furnace.

Regarding the temperature elevating speed, Kang '129 does teach increasing the temperature at a rate of 1 or 2°C per minute (column 3, lines 6-7 and 18). Kang '129 further teaches that the heat-treatment conditions are result effective variables because they may be altered in order to optimize size, shape, and microstructures of the resulting silica spheres (see column 1, lines 28-31). It has been held that discovering

an optimum value of a result effective variable involves only routine skill in the art. Please see In re Boesch, 617 F.2d 272, 205 USPQ (CCPA 1980). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Kang '129 by optimizing the heat-treatment conditions, including temperature elevating speed, for the benefit of optimizing size, shape, and microstructures of the resulting silica spheres, and further that increasing the temperature elevating speed minimizes heat treatment time, thereby increasing manufacturing efficiency.

In analogous art of forming porous ceramic spheres, Duraiswami '873 teaches performing heat-treatment in a rotary tube furnace (column 4, line 66-column 5, line 1; column 8, lines 30-63) for the benefit of optimizing physical properties of the resulting spheres (see Table 9, column 8). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Kang '129 with the heat-treatment in a rotary tube furnace of Duraiswami '873 for the benefit of optimizing physical properties of the resulting spheres.

9. Regarding claim 2, Kang '129 is silent regarding pore size and pore volume of the silica gel. However, Kang '129 teaches that the properties of the silica gel are result effective variables because they may be selected in order to optimize size, shape, and microstructures of the subsequently formed silica spheres (see column 1, lines 28-31). Please see In re Boesch, 617 F.2d 272, 205 USPQ (CCPA 1980). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Kang '129 and Duraiswami '873 by selecting silica gel having

optimum pore size and pore volume for the benefit of optimizing size, shape, and microstructures of the subsequently formed silica spheres.

10. Claims 6, 7, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang '129 (US Patent No. 5,650,129) in view of Dobson ‘988 (US Patent No. 4,392,988) and Duraiswami '873 (US Patent No. 6,616,873 B1).

11. Regarding claim 6, Kang ‘129 teaches a heat treatment process, wherein silica gel is subjected to a heat-treatment at 1050 to 1200°C (“Silica gel particles…heated… up to 1100°C", column 3, lines 1-7). Kang ‘129 is silent regarding a first heat-treatment and regarding the heat-treatments being performed in rotary tube furnaces.

In analogous art of forming porous ceramic spheres, Dobson ‘988 teaches a first heat-treatment at 400 to 900°C for the benefit of decomposing any organic constituents (column 3, lines 49-62; column 5, lines 10-11) and driving off water from the gel to create porosity in the spheres (column 2, lines 49-56). Dobson '988 teaches increasing the temperature gradually up to the desired temperature, but Dobson ‘988 is silent regarding the claimed speed of 35 to 70°C per minute up to 700°C. However, Kang ‘129 teaches that heat-treatment temperature and temperature elevation speed are result effective variables as described for claim 1 above. Please see In re Boesch, 617 F.2d 272, 205 USPQ (CCPA 1980).

Dobson ‘988 further teaches using at least two furnaces for a first and a second heat-treatment for the benefit of maintaining the furnaces at different temperatures,

thereby ensuring more precise process controls and enabling continuous processing of the spheres (see column 5, lines 9-17).

In analogous art of forming porous ceramic spheres, Duraiswami '873 teaches performing heat-treatment in a rotary tube furnace (column 4, line 66-column 5, line 1; column 8, lines 30-63) for the benefit of optimizing physical properties of the resulting spheres (see Table 9, column 8).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Kang '129 with the heat-treatments of Dobson '988 and the heat-treatment in a rotary tube furnace of Duraiswami '873 for the benefit of decomposing any organic constituents and driving off water from the gel to create porosity in the spheres, ensuring more precise process controls and enabling continuous processing of the spheres, and optimizing physical properties of the resulting spheres.

12. Regarding claim 7, Kang '129 further teaches the second heat treatment is performed for 20 to 60 minutes (column 3, lines 7-8). Kang '129 is silent regarding the first heat treatment. Dobson '988 teaches first heat treatment as described for claim 6 above. Dobson '988 further teaches the first heat treatment is performed for 20 to 60 minutes (column 3, lines 61-62) for the benefit of decomposing organic constituents and driving off water from the gel to create porosity in the spheres. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined teachings of Kang '129, Dobson '988, and Duraiswami '873 further with the

first heat treatment time of Dobson '988 for the benefit of decomposing organic constituents and driving off water from the gel to create porosity in the spheres.

13. Regarding claim 9, Kang '129 teaches the silica gel is subjected to a heat treatment at a temperature of 1100 to 1150°C ("Silica gel particles…heated… up to 1100°C", column 3, lines 1-7). Kang '129 is silent regarding a rotary tube furnace. Dobson '988 teaches a second furnace for a second heat treatment, as described for claim 6 above, for the benefit of maintaining the furnaces at different temperatures, thereby ensuring more precise process controls and enabling continuous processing of the spheres (see column 5, lines 9-17). Duraiswami '873 teaches performing heat-treatment in a rotary tube furnace, as described for claim 6 above, (column 4, line 66-column 5, line 1; column 8, lines 30-63) for the benefit of optimizing physical properties of the resulting spheres (see Table 9, column 8). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Kang '129 with the second furnace of Dobson '988 and the rotary tube furnace of Duraiswami '873 for the benefit of maintaining the furnaces at different temperatures, thereby ensuring more precise process controls and enabling continuous processing of the spheres, and for optimizing physical properties of the resulting spheres.

Response to Arguments

14. Acknowledgement is made of amendments to the claims in response to the claim objections and the rejections of the previous office action under 35 USC § 112, 2nd

paragraph. The claim objections and the rejections under 35 USC § 112, 2nd paragraph of the previous office action are withdrawn.

15. Applicant's arguments filed 06-26-2009 have been fully considered but they are not persuasive. Applicant's arguments are summarized as follows:

a. Kang '427 uses and alumina crucible and does not teach or suggest using a rotary tube furnace as claimed.

b. Kang '427 uses a temperature increase speed of 2°C per minute and does not teach or suggest using a speed of 5°C to 90°C per minute as claimed.

Response:

a. Kang '129, which is an English language equivalent of the previously applied Kang '427, has not been relied upon to teach a rotary tube furnace. In light of applicant's amendment to claim 1, Kang '129 has been modified by Duraiswami '873, which does teach a rotary tube furnace.

b. Kang '129, which is an English language equivalent of the previously applied Kang '427, is silent regarding specifically a temperature increase speed of 5°C to 90°C per minute. However, in light of applicant's amendment to claim 1, it is noted that Kang '129 does suggest that heat-treatment conditions are result effective variables because they may be altered in order to optimize size, shape, and microstructures of the resulting silica spheres, as described above. Please see In re Boesch, 617 F.2d 272, 205 USPQ (CCPA 1980). Further, it is considered that increasing the temperature elevating speed would have been obvious to one of ordinary skill in the art at the time of the invention for the

benefit of minimizing heat treatment time, thereby increasing manufacturing efficiency, as also described above.

16. Applicant's remaining arguments with respect to all pending claims have been considered but are moot in view of the new ground(s) of rejection, as necessitated by applicant's amendment.

Response to Amendment

17. The declaration under 37 CFR 1.132 filed 06-26-2009 is noted but is moot in view of the new grounds of rejection, as necessitated by applicant's amendment.

Further, the declaration is not persuasive because it fails to show unexpected results from utilization of a rotary furnace, especially in view of Duraiswami '873. As described in the rejections above, Duraiswami '873 teaches that sphere properties may be optimized by utilizing a rotary furnace for heat treatment (Table 9, column 8). An affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a *prima facie* case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin Snelting whose telephone number is (571)272-7169. The examiner can normally be reached on Monday to Friday 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on (571)272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Eric Hug/
Primary Examiner, Art Unit 1791